

Having described the invention, what is claimed is:

1. In combination a fan filter with operating fan and fastening means; Said fan filter with operating fan comprising: an operating fan having base, protective cage with bars and guard rings, blades with motor to create primary airflow within enclosed space, elongated stand member which secured to a motor at one end, and to the base at the other; a filter media having a width  $H$  measured in direction parallel to primary airflow axis, said filter media being placed at distance  $L$  beyond the periphery of said fan blades,  $L$  being measured perpendicularly to the primary airflow axis, where  $L$  is not less than  $0.26(H)$ ; at least one loop-threaded sheet (or hook-threaded sheet) secured to the interior (or exterior) surface of the said filter media; said each fastening mean comprising: a hook-threaded sheet (or loop-threaded sheet) secured to a stop zone at one end, said stop zone including an enlarged head portion having a rectangular slot with at least one stop paw-like tooth mean; the other end of said stop zone is secured to one end of the elongated strap portion with plurality equally spaced stop elements at least on one side. Said paw-like tooth serves as engaging the stop element and arresting the said strap when the strap is extended through the said rectangular slot soon after the said strap was attached or wrapped around to either stationary element

260790-66422880

of the enclosed space or to a stationary element of a fan; a tail portion connected with the free end of the said elongated strap portion. The said tail portion facilitates easy initial insertion of said elongated strap into the rectangular slot of the said enlarged head portion. A loop-threaded sheet from filter media and a hook-threaded sheet from fastening mean when pressed together serve two goals: for securing the said fan filter and for isolate the said fan filter from vibration. Made from flexible plastic materials, said head portion and elongated strap portion serve also for said two goals.

2. A fan filter with fastening means according to claim 1, wherein the hook-threaded sheet (or lop-threaded sheet), head portion, elongated strap and tail portions, manufactured as an injection molded, one piece unit formed of plastic material.
3. A fan filter with fastening means according to claim 1, wherein the said enlarged head portion have flag for securing a hook-threaded sheet (or loop-threaded sheet).
4. A fan filter with fastening means according to claim 1, wherein said paw-like tooth made from the stainless steel and is permanently embedded in the said head portion.
5. A fan filter with fastening means according to claim 1, wherein the filter media includes activated carbon either alone or in combination with filter coated with material having electrostatic properties.

260790-6642880

6. A fan filter with operating fan and fastening means according to claim 1, wherein said air filter is attached, with the help of said straps from fastening means to said base of operating fan for the purpose of reducing vibration of the fan filter.
7. A fan filter with operating fan and fastening means, according to claim 1, wherein said operating fan has a weighted base; the weight and said base are attached together and become a said stationary element of the fan to which said fan filter is attached with the help of said fastening means; the weighted base is acting as additional vibration dampening and vibration isolation unit.
8. A fan filter with operating fan and fastening means, according to claim 1, wherein said operating fan includes additional elongated stand member and additional ring; one end of said elongated stand member is attached to said fan base, and other end is attached to said ring; said ring become an additional stationary element of said fan; said fan filter is attached to said stationary element with the help of said fastening means for purpose of reducing vibration of the filter.
9. A fan filter with operating fan and fastening mean, according to claim 1, wherein said hook-threaded sheet (or loop-threaded sheet from said fastening mean has a mushroom-shaped form.

08872499-061097

10. In combination a fan filter with operating fan and fastening means; said fan filter with operating fan comprising: an operating fan having base, protective cage with bars and guard rings, blades with motor to create primary airflow within enclosed space, elongated stand member which secured to a motor at one end, and to the base at the other; a filter media having a width  $H$  measured in direction parallel to primary airflow axis, said filter media being placed at distance  $L$  beyond the periphery of said fan blades,  $L$  being measured perpendicularly to the primary airflow axis, where  $L$  is not less, than  $0.26(H)$ ; at least one loop-threaded sheet (or hook-threaded sheet) secured to the interior (or exterior) surface of the said filter media;

said each fastening mean comprising a hook-threaded sheet including a hook-threaded surface portion and a knitted back portion. Fastening mean is formed when said hook-threaded sheet was wrapped around guard ring (or rings) in direction perpendicular to primary airflow axis such that two half of equal quantity of hook-threaded sheet surfaces facing out and two equal half of knitted surfaces facing in. Two equal half of knitted surfaces attached together with the help of elastic bonding adhesive, staple or velcro fasteners. A loop-threaded sheet from said filter media and a hook-threaded sheet from fastening mean when pressed together serve for two goals: for securing the said filter media and for isolation of said fan filter from vibration. Made from flexible plastic material said head portion and elongated strap portion also serves for said two goals.

260750-55422880

11. In combination a fan filter with operating ceiling fan and fastening means; said fan filter with operating ceiling fan comprising: an operating ceiling fan having a tubular conduit, motor with rotatable blades extending radially to create primary airflow within enclosed space, fan filter having a width H measured in direction parallel to primary airflow axis, said fan filter being placed at distance L beyond the periphery of said fan blades and above said operating ceiling fan at distance P which is approximately from 3 to 5 centimeters, L being measured perpendicularly to the primary airflow axis, where L is not less than  $0.26(H+P)$ ; at least one loop-threaded sheet (or hook-threaded sheet) secured to the exterior surface of said fan filter;

said each fastening mean comprising: a hook-threaded sheet (or loop-threaded sheet) secured to stop zone at one end, said stop zone including an enlarged head portion having a rectangular slot with at least one stop paw-like tooth mean; the other end of said stop zone is secured to one end of elongated strap portion with plurality equally spaced stop elements at least on one place; said paw-like tooth (or teethes) serves as engaging stop element and arresting said strap when the strap is extended through said rectangular slot soon after said strap was attached to ceiling by mean of a hanger-bracket having at least one elongated stand member and one ring; said at least one elongated stand member is attached to ceiling

060790 6542880

at one end and to said ring at other end; a tail portion connected with the free end of said elongated strap portion; said tail portion facilitate initial insertion of said elongated strap into rectangular slot of said enlarged head portion. loop-threaded sheet from said fastening mean when pressed together serve two goals: securing said fan filter and isolate said fan filter from vibration. Made from flexible plastic material, said head portion and elongated strap portion serve also said two goals. For best result of lessen vibration of the fan filter it is recommended to attache said fan filter to places where ceiling has rigider structure.

260790-6642880

12. In combination a fan filter with operating fan and fastening means; said fan filter with operating fan comprising: an operating fan having base and guard rings, blades with motor to create primary airflow within enclosed space, elongated stand member which secured to motor at one end, and to the base at the other; a fan filter 21E with rectangular slot 60, having a filter media 12E which width H measured in direction parallel to primary airflow axis, said filter media being placed at distance L beyond the periphery of said blades, L being measured perpendicularly to the primary airflow axis, where L is not less than  $0.26(H)$ , cover 22 and hook threaded sheet 58 with rectangular slot 59;

each fastening mean 16E comprising: a strap 10E and a cushion 56 made from foam which damp vibration. Strap 10E includes an enlarged head portion 53 having rectangular slot 57, elongated part 55, both made from flexible plastic materials, and loop-threaded sheet portion 54 attached to elongated part 55 or manufactured with part 55 as injection molded, one piece unit; cushion 56 has a slot 61 extending from its outer periphery to its central area to permit the foam cushion 56 to be slipped over the two guard rings 3.

For assemble a fan filter 21E with fastening means 16E, which comprises 4 parts 21E, 10E, 56 and 58, it is necessary to sew them together by three separated seams, as it is shown by the dotted line 14. The sewing operation with said four parts of

260790" 66422880

fan filter 21E with fastening means 16E must be performed in 3 to 8 places on the filter media 12E depending of dimension of a fan 15.

For assemble a fan filter 21E and fastening means 16E with operating fan 15 , it must be put around rings 3 in the way that every foam cushion slips over two rings 3 of the fan's protective cage with the help of slots 61 of the cushions 56.

After this, the loop-threaded sheet 54 is folded along the dotted line 62, and the elongated portion 55 of the strap 10E is extended through three rectangular slots (holes) 57, 60 and 59. Direction of the movement of the strap 10E is shown by multiple arrows 63.

When loop-threaded sheet 54 will go out from slot (hole) 59 to exterior surface of the fan filter 21E, it must be straightened and pulled slightly for fastening fan filter 21E with cushion 56 to guard rings 3. Straightened loop-threaded sheet 54 has to be pressed to hook-threaded sheet 58 for attach one of the parts of fan filter 21E to rings 3. Quantity of fan filter's 21E parts, which must be attached to rings 3 in 3 to 8 places, depends of dimension of the fan 15.

Every rectangular slot 57, 59 and 60 has a side less than side M of the loop-threaded sheet 54. Therefore, the folded loop-threaded sheet 54 permits easy movement of the part 55 of strap 10E through three small slots 57, 59

08872499 061097 260790 66422880



and 60 in the insertion direction (shown by multiple arrow 63) and prevents movement of the strap 10E in a withdrawal direction opposite the insertion direction when the loop-threaded sheet 54 is straightened just after passing through three slots.

The definitive attachment of the loop-threaded sheet 55 (that is to say of the strap 10E) take place when it is pressed together with hook-threaded sheet 58 on the exterior surface of fan filter 21E.

0887249-061097

13. In combination a fan filter with diffuser, operating fan and fastening means; said fan filter with diffuser and operating fan comprising: an operating fan having blades with motor to create primary airflow passing through diffuser outlet within enclosed space, elongated stand member secured to said motor at one end and to interior surface of duct at the other end; said duct attached to source of air (fresh, cold or hot) at one end and to diffuser outlet (or outlet grill) at the other end. Said diffuser outlet is placed at the level of ceiling and has inclined vanes from which the airflow goes out at angle (from  $15^{\circ}$  to  $30^{\circ}$ ) to perpendicular to the floor, making possible greater comfort for the room occupants; a fan filter having a width H measured in direction parallel to primary airflow axis, and at least one loop-threaded sheet (or hook-threaded sheet) secured to the interior (or exterior) surface of said fan filter;

said each fastening mean comprising: a hook-threaded sheet (or loop-threaded sheet) secured to stop zone at one end, said stop zone including an enlarged head portion having a rectangular slot with at least one stop paw-like tooth mean; the other end of said stop zone is secured to one end of elongated strap portion with plurality equally spaced stop elements at last on one place; said paw-like tooth (or teethes) serve as engaging said stop element and arresting said strap when the strap is extended through said rectangular slot soon

08872499-061097

after said strap was attached to ceiling by mean of hanger-bracket having at least one elongated stand member and one ring; said at last one elongated stand member is attached to ceiling at one end, and to said ring at the other end; a tail portion connected with the free end of said elongated strap portion; said tail portion facilitate initial insertion of said elongated strap into rectangular slot of said enlarged head portion; interior surface of said fan filter being placed at distance L beyond the perimeter of lower part of said diffuser grill (grill outlet) and being mounted at distance h bellow it, distance L being measured perpendicularly to the axis of primary airflow, where L is not less than determined by following equation:

$$L \geq 0.26(h+H) + \operatorname{tg} S(h+H)$$

Where h is part of height of a fastening mean placing between lower part of diffuser and top part of fan filter, H is the width of fan filter, S is the angle between the inclined surface of van and perpendicular to the floor;

said loop-threaded sheet from fan filter and said hook-threaded sheet from fastening mean when pressed together serve two goals: securing said fan filter and isolate said fan filter from vibration. Made from flexible plastic material, said head portion and elongated strap portion serve also said two goals.

08872499-061097

Add a3